

1974 SHORT-SEASON COTTON VARIETY TESTS

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1974 SHORT-SEASON COTTON VARIETY TESTS

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ABSTRACT

Twenty short-season cotton varieties (*Gossypium hirsutum* L.) were grown at Weslaco, Tex. Yield, micronaire, length uniformity, strength, growth and fruiting characteristics, and earliness are reported. Earliness was judged by four different measures.

INTRODUCTION

Interest in short-season management systems for improving cotton (*Gossypium hirsutum* L.) production efficiency has created a need to evaluate the performance of recently released early-maturing varieties and advanced strains under lower Rio Grande Valley conditions. These tests, performed at Weslaco, Tex., supplement regular cotton variety tests by obtaining more detailed information on earliness, fruiting characteristics, and plant growth. They also provide a direct comparison of the performance of conventional varieties with early-maturing varieties recently released or advanced strains about to be released.

This information will help cotton growers decide whether it would be advantageous to use the new varieties in a short-season management system. It will also help cotton breeders evaluate the performance of advanced early-maturing strains under southern Texas environmental conditions.

METHODS

The 1974 tests were conducted on a Hidalgo sandy clay loam at the Soil and Water Conservation District-Agricultural Research Service Research Farm, 5 miles north of Weslaco, Tex. A randomized complete-block design with 3 replications was used to accommodate 20 varieties and advanced strains. The entries were planted in a double-drill configuration with the two drills 8 inches apart on 40-inch centers (shaped beds) and irrigated on February 28.

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Each plot was four rows wide and 40 feet long. Stands were thinned to 60,000 to 65,000 plants per acre on March 22. The plots were irrigated once in alternate furrows on June 4. Total rainfall from planting to defoliation (July 22, 144 days after planting) was 4.5 inches. Insecticide applications were based on recommendations provided by a pest-management scouting program. No fertilizer was applied.

In the tables reporting results, means not followed by the same letter are significantly different at the 0.05 probability level as indicated by Duncan's multiple-range test.

YIELD AND STAPLE CHARACTERISTICS

Twenty-five feet of the southern inside row of each plot was handpicked, with the first harvest on July 8 (130 days after planting). Subsequent harvests were on July 17, July 29, and August 13 to establish yield-maturity curves. The northern inside row of each plot was harvested on August 1 and August 13. Total lint yields (table 1) were obtained by averaging the yields from the two inside rows in each plot. The lint-quality measurements (tables 2-7) were made on samples from the August 1 harvest of the north inside row. Since growers usually mechanically harvest cotton at this maturity, the August 1 harvest, having been exposed to the weather for the same amount of time, should be similar in quality to mechanically harvested cotton. The lint-quality measurements (length, micronaire, uniformity, and strength) reported in tables 4-7 were made on 250-gram lint samples by the Texas Tech University Textile Research Center, Lubbock.

TABLE 1.—*Lint yield*

| Variety or strain | Pounds/acre |
|--------------------------|-------------|
| McNair 2-520 | 1,449 A |
| TX-CAMD-E-73C | 1,375 AB |
| TX-6M-10 | 1,371 AB |
| Lockett 1140 | 1,326 ABC |
| 'TPSA 1633' | 1,245 BCD |
| McNair 71317 | 1,196 BCD |
| 'Tamecot SP-37' | 1,168 CDE |
| 'Lambright GL-4' | 1,160 CDE |
| 'TPSA 110' | 1,143 CDE |
| Lockett 77-4 | 1,123 DEF |
| 'Paymaster Dwarf' | 1,119 DEF |
| Arkugo #4 | 1,118 DEF |
| Lockett 44-O.L. | 1,112 DEF |
| 'Quapaw' | 1,096 DEF |
| 'McNair 210' | 1,054 DEFG |
| 'Stoneville 7A' | 998 EFG |
| 'Stoneville 213' | 946 FG |
| 'Lambright X-15-4' | 932 FG |
| 'New Rex' | 895 G |
| Paymaster 1764 | 877 G |

TABLE 2.—*Lint percentage*

| Variety or strain | Percent |
|--------------------------|----------|
| 'Paymaster Dwarf' | 36.9 A |
| TX-CAMD-E-73C | 36.3 AB |
| McNair 2-520 | 35.9 ABC |
| 'Tamecot SP-37' | 35.7 ABC |
| 'Stoneville 213' | 35.4 BC |
| 'Lambright GL-4' | 35.3 BCD |
| 'Stoneville 7A' | 34.8 CDE |
| TX-6M-10 | 34.7 CDE |
| Lockett 77-4 | 34.6 CDE |
| McNair 71317 | 34.6 CDE |
| Lockett 44-O.L. | 34.6 CDE |
| Lockett 1140 | 34.4 CDE |
| 'TPSA 110' | 33.9 DEF |
| 'TPSA 1633' | 33.8 EF |
| 'McNair 210' | 33.0 FG |
| 'Quapaw' | 32.7 FG |
| 'Lambright X-15-4' | 32.1 GH |
| Paymaster 1764 | 32.1 GH |

TABLE 3.—*Average boll size—Continued*

| Variety or strain | Grams/boll ¹ |
|-------------------------|-------------------------|
| TX-6M-10 | 5.11 BCDE |
| 'TPSA 110' | 5.05 CDEF |
| 'New Rex' | 4.97 DEFG |
| Lockett 1140 | 4.92 DEFG |
| Lockett 44-O.L. | 4.84 EFG |
| 'McNair 210' | 4.65 FGH |
| 'Stoneville 213' | 4.64 FGH |
| 'Stoneville 7A' | 4.58 GH |
| TX-CAMD-E-73C | 4.56 GH |
| 'Paymaster Dwarf' | 4.32 H |
| 'Tamecot SP-37' | 4.30 H |
| Arkugo #4 | 4.26 H |
| McNair 71317 | 4.22 H |

¹Boll size was determined by dividing total weight of bolls by total number of bolls picked from 25 feet of row.

TABLE 4.—*Staple length, 2.5% span*

| Variety or strain | Inches |
|--------------------------|-------------|
| 'Lambright X-15-4' | 1.18 A |
| 'New Rex' | 1.17 AB |
| Paymaster 1764 | 1.16 ABC |
| 'TPSA 1633' | 1.15 ABCD |
| 'Stoneville 7A' | 1.14 ABCD |
| Lockett 1140 | 1.13 ABCDE |
| 'Tamecot SP-37' | 1.13 ABCDEF |
| McNair 2-520 | 1.12 ABCDEF |
| 'Stoneville 213' | 1.12 ABCDEF |
| Lockett 44-O.L. | 1.12 ABCDEF |
| 'TPSA 110' | 1.12 ABCDEF |
| McNair 71317 | 1.11 BCDEFG |
| 'McNair 210' | 1.10 CDEFG |
| 'Lambright GL-4' | 1.09 DEFG |
| 'Quapaw' | 1.07 EFGH |
| Lockett 77-4 | 1.06 FGHI |
| TX-6M-10 | 1.05 GHI |
| TX-CAMD-E-73C | 1.03 HI |
| Arkugo #4 | 1.02 HI |
| 'Paymaster Dwarf' | 1.01 I |

TABLE 5.—*Staple micronaire*

| Variety or strain | Index |
|----------------------|------------|
| #4 | 4.83 A |
| v' | 4.83 A |
| ille 7A' | 4.80 A |
| ille 213' | 4.73 AB |
| · 210' | 4.60 ABC |
| 44-O.L. | 4.57 ABCD |
| 2-520 | 4.47 ABCDE |
| 1633' | 4.40 BCDE |
| 71317 | 4.37 BCDE |
| 110' | 4.33 CDE |
| MD-E-73C | 4.20 DEF |
| ex' | 4.17 EF |

TABLE 5.—*Staple micronaire*—Continued

| Variety or strain | Index |
|--------------------------|---------|
| Lockett 1140 | 4.17 EF |
| 'Paymaster Dwarf' | 4.13 EF |
| Lockett 77-4 | 3.90 FG |
| Paymaster 1764 | 3.73 GH |
| 'Lambright GL-4' | 3.67 GH |
| 'Lambright X-15-4' | 3.67 GH |
| TX-6M-10 | 3.67 GH |
| 'Tancot SP-37' | 3.40 H |

TABLE 6.—*Staple uniformity*

| Variety or strain | Ratio |
|--------------------------|-----------|
| Lockett 44-O.L. | 81.0 A |
| Lockett 1140 | 81.0 A |
| 'Stoneville 7A' | 81.0 A |
| 'Stoneville 213' | 81.0 A |
| 'Quapaw' | 80.7 A |
| Arkugo #4 | 80.3 A |
| McNair 2-520 | 80.3 A |
| Paymaster 1764 | 80.3 A |
| 'New Rex' | 79.7 AB |
| 'Paymaster Dwarf' | 79.7 AB |
| McNair 71317 | 79.3 AB |
| Lockett 77-4 | 79.0 ABC |
| 'McNair 210' | 79.0 ABC |
| TX-CAMD-E-73C | 78.3 ABCD |
| 'Lambright X-15-4' | 78.3 ABCD |
| 'TPSA 1633' | 77.7 ABCD |
| 'TPSA 110' | 77.7 ABCD |
| 'Tancot SP-37' | 76.3 BCD |
| 'Lambright GL-4' | 75.7 CD |
| TX-6M-10 | 75.3 D |

TABLE 7.—*Staple strength*

| Variety or strain | Grams/tex |
|--------------------------|-----------|
| McNair 2-520 | 24.0 A |
| 'TPSA 1633' | 22.7 AB |
| 'Lambright X-15-4' | 22.7 AB |
| 'McNair 210' | 22.3 ABC |
| 'Lambright GL-4' | 22.3 ABC |
| Lockett 1140 | 22.3 ABC |
| Lockett 44-O.L. | 22.0 ABCD |
| Paymaster 1764 | 21.7 ABCD |
| 'Tancot SP-37' | 21.7 ABCD |
| 'TPSA 110' | 21.3 ABCD |
| 'Stoneville 213' | 21.3 ABCD |
| McNair 71317 | 20.3 BCDE |
| 'Stoneville 7A' | 20.3 BCDE |
| Lockett 77-4 | 20.3 BCDE |
| TX-CAMD-E-73C | 20.3 BCDE |
| 'Quapaw' | 20.3 BCDE |
| 'Paymaster Dwarf' | 19.3 CDE |
| TX-6M-10 | 19.3 CDE |
| 'New Rex' | 19.0 DE |
| Arkugo #4 | 18.0 E |

PLANT GROWTH AND FRUITING

Fifteen randomly selected plants in the north inside row of each plot were flagged at the six-leaf stage. All plant-growth and fruit-load measurements, reported in tables 8–15, were made on these plants at various stages of the season except the dates of first square and first bloom (tables 8 and 9), which were recorded for each plot, using all four rows in the plot.

TABLE 8.—*Days from planting to first square*

| Variety or strain | Days |
|--------------------------|----------|
| 'Paymaster Dwarf' | 32.0 A |
| 'TPSA 1633' | 32.0 A |
| 'Tancot SP-37' | 32.0 A |
| 'Lambright GL-4' | 32.0 A |
| 'Quapaw' | 32.0 A |
| Arkugo #4 | 32.0 A |
| Lockett 77-4 | 32.7 AB |
| 'TPSA 110' | 33.0 ABC |
| Lockett 1140 | 33.0 ABC |
| TX-CAMD-E-73C | 33.7 BCD |
| 'Lambright X-15-4' | 33.7 BCD |
| Paymaster 1764 | 33.7 BCD |
| McNair 2-520 | 33.7 BCD |
| McNair 71317 | 33.7 BCD |
| 'Stoneville 7A' | 34.3 CDE |
| 'McNair 210' | 34.3 CDE |
| TX-6M-10 | 34.7 DE |
| Lockett 44-O.L. | 35.0 DE |
| 'New Rex' | 35.7 E |
| 'Stoneville 213' | 37.7 F |

TABLE 9.—*Days from planting to first white bloom*

| Variety or strain |
|--------------------------|
| TX-CAMD-E-73C |
| 'Paymaster Dwarf' |
| 'Lambright GL-4' |
| 'Tancot SP-37' |
| 'Quapaw' |
| Lockett 77-4 |
| Arkugo #4 |
| Lockett 1140 |
| Paymaster 1764 |
| TX-6M-10 |
| 'McNair 210' |
| McNair 2-520 |
| 'TPSA 1633' |
| 'TPSA 110' |
| 'Lambright X-15-4' |
| McNair 71317 |
| Lockett 44-O.L. |
| 'Stoneville 7A' |
| 'Stoneville 213' |
| 'New Rex' |

TABLE 10.—*Plant height at 60 days from planting*

| Variety or strain | Centimeters |
|----------------------|-------------|
| Arkugo #4 | 33.0 A |
| 'Quapaw' | 31.9 AB |
| 'TPSA 1633' | 31.8 AB |
| Lockett 1140 | 30.7 ABC |
| Lockett 77-4 | 30.3 ABCD |
| 'Tancot SP-37' | 30.0 BCDE |
| 'TPSA 110' | 29.5 BCDEF |
| 'Lambright GL-4' | 29.5 BCDEF |
| 'Lambright X-15-4' | 29.3 BCDEFG |
| McNair 2-520 | 29.2 BCDEFG |
| 'Paymaster Dwarf' | 27.8 CDEFGH |
| TX-CAMD-E-73C | 27.8 DEFGH |
| Paymaster 1764 | 27.4 EFGH |
| 'Stoneville 7A' | 27.3 EFGH |
| 'McNair 210' | 27.0 FGH |
| McNair 71317 | 26.5 GH |
| Lockett 44-O.L. | 25.9 H |
| 'Stoneville 213' | 25.9 H |
| TX-6M-10 | 25.5 H |
| 'New Rex' | 21.9 I |

TABLE 11.—*Plant height at 90 days from planting*

| Variety or strain | Centimeters |
|----------------------|-------------|
| Lockett 44-O.L. | 89.9 A |
| 'TPSA 110' | 89.9 A |
| 'Lambright X-15-4' | 89.5 A |
| 'TPSA 1633' | 86.5 AB |
| Lockett 77-4 | 85.7 ABC |
| 'Stoneville 7A' | 85.2 ABCD |
| 'McNair 210' | 82.8 BCDE |
| 'Stoneville 213' | 82.6 BCDE |
| 'Quapaw' | 81.4 BCDEF |
| Arkugo #4 | 80.4 CDEF |
| McNair 71317 | 80.4 CDEF |
| Lockett 1140 | 80.2 CDEF |
| 'Lambright GL-4' | 79.4 DEFG |
| Paymaster 1764 | 79.2 EFG |
| 'Tancot SP-37' | 77.4 EFG |
| McNair 2-520 | 76.5 FG |
| 'New Rex' | 75.9 FG |
| TX-6M-10 | 74.2 GH |
| 'Paymaster Dwarf' | 69.7 H |
| TX-CAMD-E-73C | 69.4 H |

TABLE 12.—*Plant height at 120 days from planting*

| Variety or strain | Centimeters |
|----------------------|-------------|
| 'TPSA 110' | 104.4 A |
| 'Lambright X-15-4' | 104.4 A |
| 'Stoneville 213' | 103.6 A |
| 'Stoneville 7A' | 103.2 A |
| 'TPSA 1633' | 97.9 AB |
| McNair 71317 | 94.7 BC |
| Lockett 44-O.L. | 94.5 BC |
| 'Quapaw' | 93.9 BC |

TABLE 12.—*Plant height at 120 days from planting*
—Continued

| Variety or strain | Centimeters |
|----------------------|-------------|
| Lockett 77-4 | 93.8 BC |
| Paymaster 1764 | 92.9 BC |
| 'McNair 210' | 92.5 BC |
| McNair 2-520 | 89.9 CD |
| 'New Rex' | 88.4 CDE |
| 'Lambright GL-4' | 85.0 DE |
| Lockett 1140 | 84.7 DE |
| Arkugo #4 | 83.5 DE |
| TX-6M-10 | 81.5 EF |
| 'Tancot SP-37' | 81.1 EF |
| 'Paymaster Dwarf' | 75.7 FG |
| TX-CAMD-E-73C | 69.7 G |

TABLE 13.—*Number of squares per plant at 60 days from planting*

| Variety or strain | Squares per plant |
|----------------------|----------------------|
| 'Paymaster Dwarf' | 10.4 A |
| Arkugo #4 | 9.2 AB |
| 'Quapaw' | 9.0 ABC |
| 'Tancot SP-37' | 8.6 ABCD |
| TX-CAMD-E-73C | 8.5 ABCDE |
| 'Lambright GL-4' | 8.1 BCDE |
| Lockett 1140 | 7.6 BCDEF |
| Paymaster 1764 | 7.4 BCDEFG |
| TX-6M-10 | 7.2 BCDEFG |
| McNair 2-520 | 7.0 BCDEFG |
| Lockett 77-4 | 6.9 BCDEFG |
| 'McNair 210' | 6.9 BCDEFG |
| McNair 71317 | 6.7 CDEFG |
| 'TPSA 1633' | 6.4 DEFG |
| 'Lambright X-15-4' | 6.3 DEFGH |
| 'TPSA 110' | 6.1 EFGH |
| 'Stoneville 213' | 5.3 FGH |
| Lockett 44-O.L. | 5.2 FGH |
| 'Stoneville 7A' | 5.2 GH |
| 'New Rex' | 4.0 H |

TABLE 14.—*Number of bolls per plant at 90 days from planting*

| Variety or strain | Bolls per plant |
|----------------------|--------------------|
| Arkugo #4 | 8.8 A |
| TX-CAMD-E-73C | 7.1 B |
| 'Paymaster Dwarf' | 6.9 BC |
| 'Tancot SP-37' | 6.8 BC |
| McNair 71317 | 6.7 BC |
| 'McNair 210' | 6.5 BCD |
| Lockett 1140 | 6.2 BCDE |
| TX-6M-10 | 6.2 BCDE |
| Paymaster 1764 | 6.2 BCDE |
| 'Lambright GL-4' | 6.2 BCDE |
| Lockett 77-4 | 6.1 BCDEF |
| 'Quapaw' | 6.1 BCDEF |

TABLE 14.—Number of bolls per plant at 90 days from planting—Continued

| Variety or strain | Bolls per plant |
|--------------------|-----------------|
| McNair 2-520 | 5.9 BCDEF |
| 'TPSA 110' | 5.7 CDEF |
| 'TPSA 1633' | 5.3 DEF |
| Lockett 44-O.L. | 5.2 DEFG |
| 'Stoneville 7A' | 4.9 EFG |
| 'Lambright X-15-4' | 4.9 EFG |
| 'Stoneville 213' | 4.8 FG |
| 'New Rex' | 4.0 G |

TABLE 15.—Number of mature bolls per plant at 120 days from planting

| Variety or strain | Bolls per plant |
|--------------------|-----------------|
| Arkugo #4 | 7.5 A |
| 'McNair 210' | 7.2 AB |
| McNair 71317 | 6.7 ABC |
| TX-6M-10 | 6.7 ABC |
| 'Tancot SP-37' | 6.6 ABC |
| Lockett 1140 | 6.5 ABC |
| Lockett 77-4 | 6.4 ABCD |
| McNair 2-520 | 6.4 ABCDE |
| TX-CAMD-E-73C | 6.3 ABCDEF |
| 'TPSA 110' | 6.2 ABCDEF |
| 'Paymaster Dwarf' | 6.2 ABCDEF |
| 'Quapaw' | 5.7 BCDEFG |
| 'Lambright GL-4' | 5.6 CDEFG |
| 'TPSA 1633' | 5.6 CDEFG |
| 'Stoneville 7A' | 5.5 CDEFG |
| 'Stoneville 213' | 5.3 CDEFG |
| Lockett 44-O.L. | 5.0 DEFG |
| Paymaster 1764 | 4.9 EFG |
| 'New Rex' | 4.7 FG |
| 'Lambright X-15-4' | 4.4 G |

EARLINESS OF CROP MATURITY

Four measures of earliness of crop maturity are reported in tables 16-20. The percentage of total yield harvested at some point during the boll-maturing stage of plant development (in these tests, percentage of total yield 130 days from planting) and mean maturity date are measures commonly used by plant breeders to evaluate earliness.

The production rate index was recently suggested by Bilbro and Quisenberry³ as a means of expressing earliness that is yield related (i.e., amount produced per unit of time). Two varieties

³J. D. Bilbro and J. E. Quisenberry. 1973. A yield related measure of earliness for cotton, *Gossypium hirsutum* L. Crop Sci. 13: 392-393.

might have approximately the same yield, but one variety could produce its yield in a shorter period of time than the other; thus, it would have a higher production rate index and would be considered more efficient.

The fruit-set index, defined by Roark⁴ as the ratio of the number of first fruiting sites on each branch having a harvestable boll to the total number of fruiting branches, expressed as a percentage, is considered a measure of adaptability to a given environment as well as a measure of earliness. A high percentage of shed at these sites (low fruit-set index) forces a higher percentage of the crop to be set on sites further out on the fruiting branches and thus delays the crop.

⁴Bruce Roark. 1972. The effects of shedding on maturity date and yield. (Abstract) Proc. Beltwide Cotton Prod. Res. Conf., p. 103.

TABLE 16.—Percent of total yield harvested at 130 days

| Variety or strain | Percent |
|--------------------|------------|
| TX-CAMD-E-73C | 41.9 A |
| Arkugo #4 | 41.1 A |
| 'Tancot SP-37' | 35.4 A |
| 'Paymaster Dwarf' | 25.2 B |
| 'Quapaw' | 24.9 B |
| McNair 2-520 | 22.9 B |
| Lockett 77-4 | 22.9 BC |
| Lockett 44-O.L. | 20.2 BC |
| Lockett 1140 | 18.9 BCD |
| 'McNair 210' | 14.8 BCDE |
| 'Stoneville 213' | 13.6 BCDEF |
| Paymaster 1764 | 12.0 CDEF |
| 'Lambright GL-4' | 11.1 CDEF |
| 'TPSA 1633' | 10.6 DEF |
| 'Stoneville 7A' | 10.1 DEF |
| 'Lambright X-15-4' | 9.7 DEF |
| 'TPSA 110' | 9.3 DEF |
| 'New Rex' | 7.8 DEF |
| TX-6M-10 | 6.3 EF |
| McNair 71317 | 4.0 F |

TABLE 17.—Mean maturity date

| Variety or strain | Days after planting |
|-------------------|---------------------|
| TX-CAMD-E-73C | 139.4 A |
| Arkugo #4 | 139.9 AB |
| 'Tancot SP-37' | 140.2 AB |
| 'Paymaster Dwarf' | 142.7 BC |
| 'Quapaw' | 142.8 BC |
| Lockett 44-O.L. | 143.5 CD |
| Lockett 77-4 | 143.6 CDE |
| McNair 2-520 | 144.4 CDE |